Assessing the relative preference of mango varieties through Paired Comparison Method in Murshidabad district of West Bengal

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ABSTRACT

Murshidabad district is famous for mango cultivation, where about more than two hundred traditional, delicate and tasty mango varieties are grown. This study conducted in the Farakka block of the Murshidabad district by interviewing eighty mango growers randomly chosen from five villages. The main objective was to find out the relative preferences of the cultivars in terms of flavour. Five mango varieties viz:Himsagar, Langra, Amrapali, Fazli, and Gopalbhog were identified and presented to the respondent in ten maximum possible pairs. They were asked to choose one variety over the other from each pair separately which contains more flavour.The Method of Paired Comparisons, an interval level of measurement (interval scale) was used for analysis of data. According to the perception of the mango growers, Langra was the tastiest variety, followed by Himsagar, Amrapali, Fazli. But Gopalbhog was perceived to be the least preferrable variety according to its flavour.

Keywords: Flavour, interval scale, mango growers, mango varieties, paired comparison, preference

Indian economy is predominantly rural in nature. So, in India, agriculture has an important impact on poverty reduction. Thus, India has achieved self-sufficiency in agriculture as well as horticulture, too (Clapp, 2017). India has a wide diversified climate and soils where many horticultural crops like fruits, vegetables, spices etc. are grown (Datta, 2013).

Among the major fruits of India, mango is considered as "King of fruits" as well as "national fruit of India"(Singh and Pathak, 2018). Mango originated in India and it traced back to ancient time. Mango is very famous for its huge adoptability, high nutritive value and wide range in variety, excellent taste and outstanding flavour (Yadav and Singh, 2017). This fruit can be consumed raw or ripe (Ajila *et al*., 2010).

West Bengal occupies prominent place in modern horticulture as well as mango cultivation (Mitra *et al*., 2013). Bengal stands eighth in cultivation of mango in India (Kerutagi *et al*., 2017). Mango is grown in the district of Malda, Murshidabad, Nadia and 24 Paraganas (North). Besides it is also grown in some other districts like Hooghly, Burdwan, Jalpaiguri and Coochbehar (Halder *et al.*, 2020).

Murshidabad, the land of Nawabs, is very famous for mangoes. Now-a-days, around two hundred traditional varieties are produced here (Dutta *et al*., 2020). The specialty of Murshidabadi mango is that these saplings are crossbred with flower and fruits. The

flavour and aroma of each variety is very delicate having very little fibre (Tharanathan *et al*., 2006). But the produce of Murshidabad district usually is not getting good market price of traditional varieties as they are non-descriptive and non-commercial varieties. Among these, Himsagar, Fazli, Langra, Amrapali, Gopalbhog are the popular varieties in Murshidabad district.The main objective is to find out the relative preferences of mango varieties according to flavour as perceived by the growers.

MATERIALS AND METHODS

The study was conducted in Farakka block under Murshidabad in West Bengal. For selection of respondents, simple random sampling techniques were used. The villages, block and the district were purposively selected. Five villages namely Alaipur, Arjunpur, Beniagram, Ballalpur and Bewa were chosen under Farakka block. Total eighty respondents (i.e., 16 respondents from Alaipur, 20 from Arjunpur, 21 from Beniagram, 15 from Ballalpur, and 8 respondents from Bewa) were chosen at random. The data were collected in May 2021 using personal interview method with the help of structured interview schedule.

Five mango cultivars had been chosen after consultation with the Assistant Director of Agriculture in order to determine the preferences of mango growers in terms of flavour. These five mango varieties were

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(A) Himsagar, (B) Langra, (C) Amrapali, (D) Fazli and (E) Gopalbhog.The five mango varieties were presented to the respondents in pairs, in maximum ten possible combinations by using the formula [n(n-1)/2]. They were requested to select one variety over the other from each pair separately which contains more flavour.

For analysis of data,the Method of Paired Comparisons (Edward, 1969) containing the F-matrix, P-matrix, rearranged P-matrix, and Z-matrix were prepared.

RESULTS AND DISCUSSION

Based on the responses of eighty mango growers from the five villages, it was determined the relative importance of five varieties in terms of flavour. The relative significance of many mango varieties for the growth of the horticulture industry in the Murshidabad district has been presented in the Table 2 for comparison of mango varieties according to flavour.

The P-matrix was then rearranged with the stimulus having the smallest column sum at the left and that with the highest at the right. The Z-matrix corresponding to the rearranged P-matrix was obtained by converting the p_{ij} entries to z_{ij} entries with the help of the Table of Normal Deviates which is presented in Table 2.

It was found from the Table 2 (Z-matrix) and Fig. 1 that Langra was the tastiest mango variety which ranked first (scale value 1.440) followed by Himsagar, Amrapali, Fazli and Gopalbhog which ranked 2nd, 3rd, 4th and 5th respectively. It was found from this study, Langra contain highest flavour as perceived by the respondents. So, it is the best variety for canning and preservation purpose. This particular variety is described as fibreless, brownish-yellow, rich in pulp, highly juicy, and possessing a strong aroma when mature. This fruit's pulp is incredibly sweet.

Himsagar placed second among the five mango varieties in terms of its flavour. On accounts of its excellent flavour and yellowish orange pulp with less fibre, Himsagar was mostly preferred by mango growers. Locally it is called "Khirsapati" in the Murshidabad district. In 2008, the "pride of Bengal" mango variety got the Geographical Indication (GI) Tag. This was the main factor to earn the rank.These results, however, were at contradiction with those of the study conducted by Sampa *et al*. (2019), which found that Langra was the tastier mango cultivar.

Amrapali was ranked third according to flavour. This study has shown that there was a little difference in the scale value between Amrapali and Fazli. According to mango growers' perception Amrapali was a little bit tastier than Fazli. By crossing between "Dasheri" and "Neelum", the flesh inside the hybrid mango Amrapali is rich in orange-red tint. The fruit of Fazli mango variety have a wonderful pale-yellow colour, firm but juicy flesh with delightful aroma and sweet in flavour. Thus Fazli, being a popular mango variety of Murshidabad and Malda received the Geographical Indication (GI) Tag in 2008. These findings were also contradicted to those of Sampa *et al*. (2019), who evaluated the Fazli after Amrapali as tasty mango cultivars.

Likewise, Gopalbhog was ranked fifth by mango growers considering its flavour. As per rule of the interval level of measurement (interval scale), its scale value has been brought down to arbitrary zero. But it does not indicate that Gopalbhog was not tasty at all. It

Table 1: F-matrix of five mango varieties judged by the eighty respondents according to flavour

F- matrix

Varieties	A	B	C	D	E
A	——	53	27	12	5
B	27	——	22	18	7
C	53	58	——	36	17
D	68	62	44	——	28
E	75	73	63	52	——

P-matrix corresponding to F-matrix

Varieties	A	B	C	D	E
A	0.500	0.662	0.337	0.150	0.062
B	0.337	0.500	0.275	0.225	0.087
C	0.662	0.725	0.500	0.450	0.212
D	0.850	0.775	0.550	0.500	0.350
E	0.937	0.912	0.787	0.650	0.500
Sum	3.286	3.574	2.449	1.975	1.211

N.B.: A=Himsagar, B=Langra, C=Amrapali, D=Fazli, E= Gopalbhog

Table 2: Z-matrix-Hierarchy of five mango varieties according to flavour after rearranging P-matrix

Varieties	Gopalbhog (E)	Fazli (D)	Amrapali (C)	Himsagar (A)	Langra (B)
Gopalbhog (E)	0.000	0.385	0.796	1.530	1.353
Amrapali (C)	-0.385	0.000	0.126	1.036	0.755
Fazli (D)	-0.800	-0.126	0.000	0.418	0.598
Himsagar (A)	-1.538	-1.036	-0.421	0.000	0.418
Langra (B)	-1.359	-0.755	-0.598	-0.421	0.000
Sum Z	-4.082	-1.532	-0.097	2.563	3.124
Mean Z	-0.816	-0.306	-0.019	0.512	0.625
Rank* (scale value) R	0.000 5th	0.510 4th	0.797 3rd	1.328 2nd	1.440 1st

Ranking was done by adding largest negative deviation (+0.816)in each column.
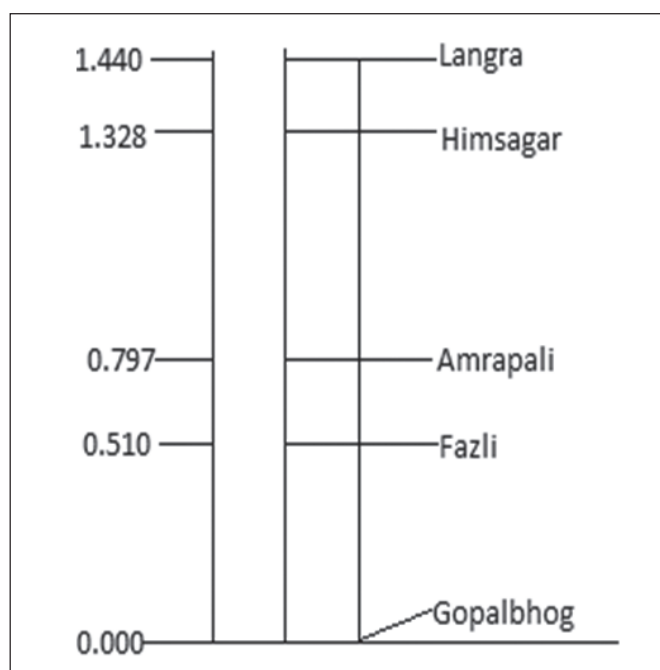
Fig. 1: Bar diagram showing flavour of mango varieties judged by mango growers

also contains flavour but it is least preferred by the mango growers in terms of taste. Thus, the scale value of Gopalbhog has been brought down to arbitrary zero and it ranked fifth position.

CONCLUSION

Mango is a popular edible fruit in India, both in its raw and processed forms. From the present study, it is found that Langra and Himsagar are the tastiest mango varieties chosen by the mango farmers. As the five mango varieties are rich source of Vitamin C and beta carotene and total soluble sugar content, growers should enhance the quality characteristics of their mangoes by adjusting their methods to meet the demands of various customer groups. Extension agencies should assist producers and handlers on how to supply markets with safely ripened, undamaged, and fresh mangoes so that,

consumers can buy the tasty and fresh mangoes from the markets (Badar *et al.*, 2016).

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